



# Road & Bridge Design Publications

## Monthly Update – May 2026

Revisions for the month of **May** are listed and displayed below and will be included in projects submitted for the **September** letting.

Email road related questions to [MDOT-Road-Design-Standards@Michigan.gov](mailto:MDOT-Road-Design-Standards@Michigan.gov).  
Email bridge related questions to [MDOT-Bridge-Design-Standards@Michigan.gov](mailto:MDOT-Bridge-Design-Standards@Michigan.gov).

### Special Details

#### **B-28-A: Bridge Barrier Railing, Type 7:**

Revised dimension for bridge barrier light standard width.

#### **B-29-A: Bridge Barrier Railing, Type 6:**

Revised dimension for bridge barrier light standard width.

### Road Design Manual

#### **Chapter 2: Grades & Earthwork:**

Reformatted the full chapter to comply with ADA accessibility which includes changing from a two column format to a single column. Only sections with content changes are included in this update.

##### **2.03.01: Slopes:**

Replaced tables with bullet lists.

##### **2.04.01A: Station Grading:**

Revised pay unit from foot to station.

##### **2.04.01C: Topsoil Stripping:**

Revised text to a bullet list. Replaced blank underline with instructional text.

##### **2.04.01E: Peat Excavation:**

Revised text to a list format.

##### **2.04.01F: Subgrade Undercutting:**

Replaced blank underline with instructional text.



# Road & Bridge Design Publications

## **2.05.02: Plan Preparation:**

Updated section to remove references to MDOT form 1775 and replace with the Environmental Classification/Certification which will be supplied by the Environmental Clearance Coordinator.

Updates to the MDOT Cell Library, Sample Plans, and other automated tools may be required in tandem with some of this month's updates. Until such updates can be made, it is the designer's/detailer's responsibility to manually incorporate any necessary revisions to notes and plan details to reflect these revisions.

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*This document contains complex files, plans, and/or information. If you require assistance accessing this information or require it in an alternative format, contact the Michigan Department of Transportation's (MDOT) Americans with Disabilities Act (ADA) coordinator at [www.Michigan.gov/MDOT-ADA](http://www.Michigan.gov/MDOT-ADA).*

# Index to Road Special Details

⑥

5-25-2026

SPECIAL DETAIL NUMBER	NUMBER OF SHEETS	TITLE	PLAN DATE
21	2	GUARDRAIL AT INTERSECTIONS	3-17-26
24	8	GUARDRAIL ANCHORED IN BACKSLOPE TYPES 4B, 4T, 7 4MGS-8	3-17-26
99	2	CHAIN LINK FENCE WITH WIRE ROPE	3-17-26
R-22-G	4	COVER V	4-14-25
R-23-F	3	COVER W	4-14-25
R-24-G	3	COVER VG (FOR USE WITH CONCRETE VALLEY GUTTER)	4-14-25
R-32-F	8	APPROACH CURB & GUTTER DOWNSPOUTS	12-5-25
R-32-SD	6	APPROACH CURB & GUTTER DOWNSPOUTS (FOR SAFETY SHAPES)	12-5-25
R-43-J	2	LOCATION OF TRANSVERSE JOINTS IN PLAIN CONCRETE PAVEMENT	2-23-26
R-44-G	7	CONCRETE PAVEMENT REPAIR	3-30-26
R-45-K	2	PAVEMENT REINFORCEMENT FOR BRIDGE APPROACH	1-4-22
R-50-H	6	LIGHT STANDARD FOUNDATION (CONCRETE BARRIER, DOUBLE FACE)	10-30-25
R-53-A	22	TEMPORARY CONCRETE BARRIER LIMITED DEFLECTION	3-30-26
R-54-J	5	CONCRETE BARRIER, SINGLE FACE	12-15-25
R-55-H	5	FILLER WALLS AT BRIDGE PIER COLUMNS	2-23-26
R-56-F	6	GUARDRAIL MEDIAN OBJECT PROTECTION	10-10-23
R-60-J	16	GUARDRAIL TYPES A, B, BD, T, TD, MGS-8, & MGS-8D	1-29-24
R-62-H	5	GUARDRAIL APPROACH TERMINAL TYPE 2M	2-23-26
R-63-C	3	GUARDRAIL APPROACH TERMINAL TYPE 3M	1-6-26
R-66-E	4	GUARDRAIL DEPARTING TERMINAL TYPES B, T, & MGS	2-23-26
R-67-G	16	GUARDRAIL ANCHORAGE, BRIDGE, DETAILS	1-6-26
R-67-SD	6	GUARDRAIL ANCHORAGE, BRIDGE, DETAILS (FOR SAFETY SHAPES)	1-6-26
R-72-D	6	GUARDRAIL LONG SPAN INSTALLATIONS	4-25-25
R-73-F	3	GUARDRAIL OVER BOX OR SLAB CULVERTS	3-30-26
R-76-F	4	CONCRETE GLARE SCREEN	11-4-25
R-80-F	9	GRANULAR BLANKETS, UNDERDRAINS, OUTLET ENDINGS, & BULKHEADS	2-5-26
R-97-D	4	HIGH TENSILE EIGHT WIRE FENCE	1-7-25
R-100-I	4	SEEDING AND TREE PLANTING	11-1-24
R-126-I	5	PLACEMENT OF TEMPORARY CONCRETE & STEEL BARRIER	8-21-25
R-127-I	8	DELINEATOR AND DRAINAGE MARKER INSTALLATIONS	10-24-25
R-130-A	6	LIGHT STANDARD DETAILS	1-6-26
R-135-A	4	TOWER LIGHTING UNIT FOUNDATION	2-21-25

**\*Denotes New or Revised Special Detail to be included in projects for (beginning with) the September letting.**

Notes:

Former Standard Plans IV-87, IV-89, IV-90, and IV-91 Series, used for building cast in place concrete head walls for elliptical and circular pipe culverts, are now being replaced with plans that detail each specific size. The Bureau of Bridges & Structures, Structure Design Section, Special Structures Unit will provide special details for inclusion in construction plans for MDOT jobs. To ensure prompt delivery, requests **must be made in advance**.

Contact: [MDOT-TriezenbergSquad@Michigan.gov](mailto:MDOT-TriezenbergSquad@Michigan.gov)

Former Standard Plans IV-93 and IV-94 series have been replaced with precast concrete box & three-sided culverts as per the 2020 Standard Specifications for Construction.

# Index to Bridge Special Details

5-25-2026

⑦

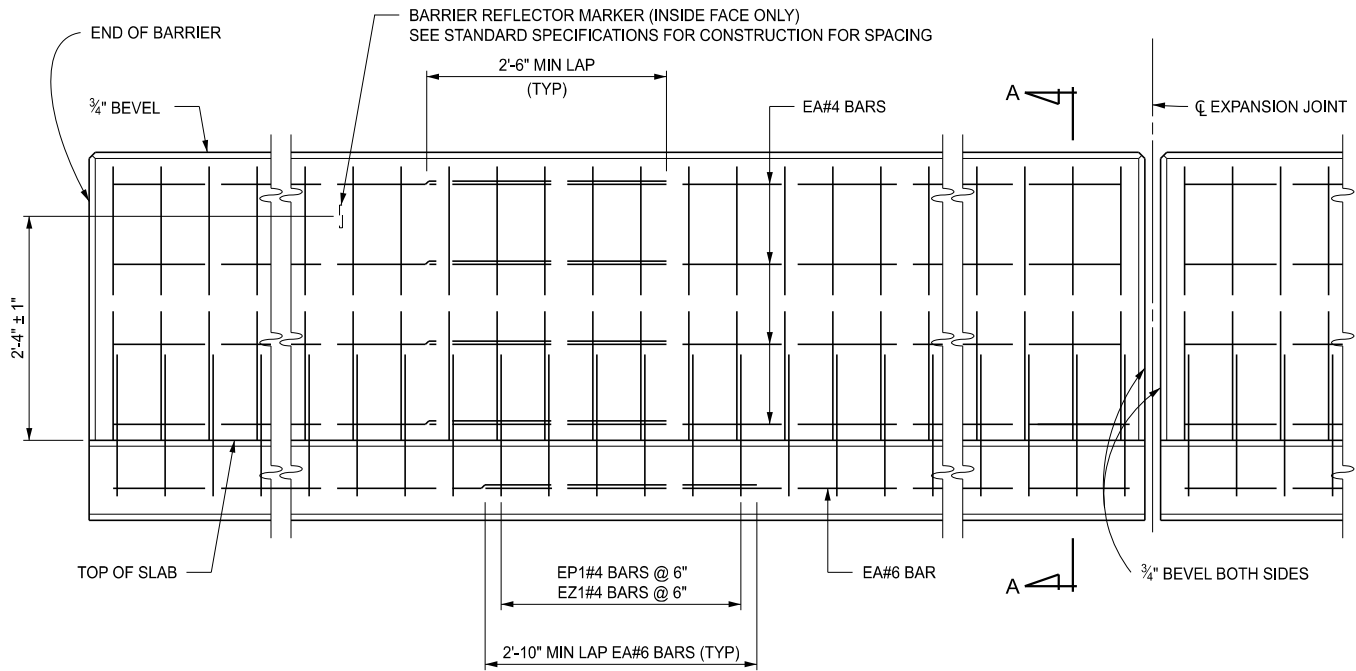
SPECIAL DETAIL NUMBER	NUMBER OF SHEETS	TITLE	PLAN DATE
B-21-K	4	BRIDGE RAILING, 2 TUBE	9-10-24
B-25-L	8	BRIDGE RAILING, AESTHETIC PARAPET TUBE	9-9-24
B-26-G	8	BRIDGE RAILING, 4 TUBE	9-6-24
B-27-B	7	BRIDGE RAILING, 3 TUBE WITH PICKETS	9-11-24
*B-28-A	7	BRIDGE BARRIER RAILING, TYPE 7	5-7-26
*B-29-A	8	BRIDGE BARRIER RAILING, TYPE 6	5-7-26
B-41-D	3	FENCING FOR BRIDGE RAILING, AESTHETIC PARAPET TUBE	12-10-25
B-42-A	3	FENCING FOR BRIDGE RAILING, 3 TUBE WITH PICKETS	1-5-26
B-102-D	4	STANDARD SLOPE PAVING DETAILS	9-18-23
B-103-F	2	MOLDING, BEVEL, LIGHT STD. ANCHOR BOLT ASSEMBLY AND NAME PLATE DETAILS	12-8-23
EJ3AG	1 to 5	EXPANSION JOINT DETAILS (See Notes)	4-28-25
EJ4T	1 to 5	EXPANSION JOINT DETAILS (See Notes)	4-28-25
PC-1Q	2	PRESTRESSED CONCRETE I-BEAM DETAILS (See Notes)	12-22-25
PC-2L	2	70" PRESTRESSED CONCRETE I-BEAM DETAILS (See Notes)	12-22-25
PC-4J	2	PRESTRESSED CONCRETE 1800 BEAM DETAILS (See Notes)	12-22-25
PC-5D	2	PRESTRESSED CONCRETE BULB-TEE BEAM DETAILS (See Notes)	12-22-25

\*Denotes New or Revised Special Detail to be included in projects for (beginning with) the September letting.

Notes:

Details EJ3AG & EJ4T are interactive, i.e., designers and detailers choose details based upon railing type and angle of crossing and fill in the project specific dimensions for the end plate. Place all details appropriate for the project (including the end plate), structure specific information, and the Expansion Joint Device quantity on the sheet(s). Add the sheet(s) to the plans as a normal plan sheets. Call out and designate the location of the expansion joint device and the end plate on the Superstructure Sheet in the plan set. Include Rail Splice Detail sheet with all plans including an Expansion Joint Device.

Details PC-1Q, PC-2L, PC-4J, and PC-5D shall have structure specific information and quantities added to the sheet. The sheet shall then be added to the plans as a normal plan sheet.



BRIDGE BARRIER RAILING, TYPE 7 OUTSIDE ELEVATION

APPROVED BY: \_\_\_\_\_  
DIRECTOR, BUREAU OF BRIDGES AND STRUCTURES

APPROVED BY: \_\_\_\_\_  
DIRECTOR, BUREAU OF FIELD SERVICES

APPROVED BY: \_\_\_\_\_  
DIRECTOR, BUREAU OF DEVELOPMENT



DEPARTMENT DIRECTOR  
BRADLEY C. WIEFERICH, PE

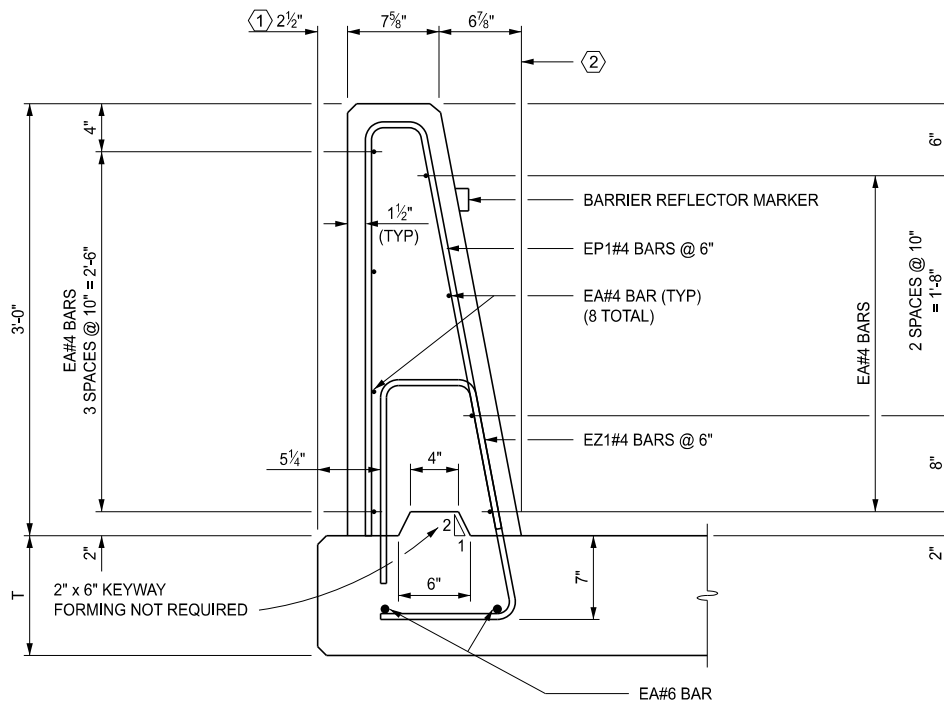
STANDARD PLAN FOR  
BRIDGE BARRIER RAILING, TYPE 7

(SPECIAL DETAIL)  
FHWA APPROVAL

05/07/2026  
PLAN DATE

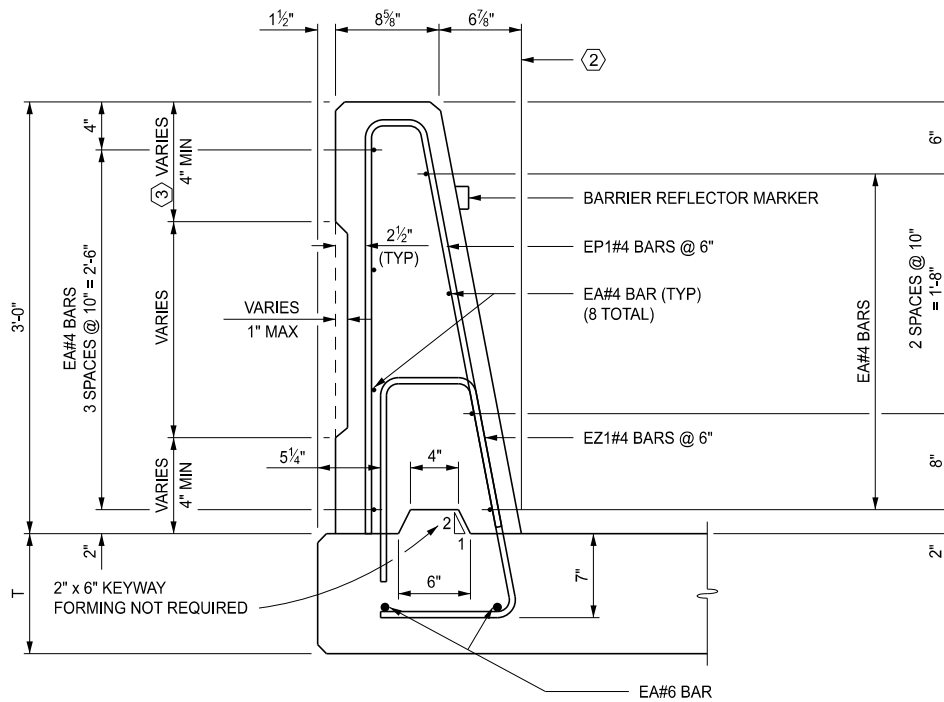
B-28-A

SHEET  
1 OF 7



**SECTION A-A**

NO AESTHETIC TREATMENT



**SECTION A-A**

BRIDGE BARRIER RAILING, AESTHETIC, TYPE 7, DET 2

( THE TYPE AND LIMITS OF THE AESTHETIC TREATMENT, )  
IF APPLICABLE, ARE AS DETAILED ON THE PLANS.

- ① BACK OF BARRIER TO SLAB FASCIA MAY BE DECREASED TO 1 1/2" (FROM 2 1/2") AND TOE OF BARRIER SHIFTED ACCORDINGLY TO ACCOMMODATE THE NEED FOR INCREASED OR MAINTAINING SHOULDER WIDTHS. DISTANCE TO BE DETAILED ON THE PLANS.
- ② BRIDGE BARRIER ORIENTATION :  
PERPENDICULAR TO PLANE OF SLAB ON NORMAL CROWN SECTION AND HIGH SIDE OF SUPERELEVATION SECTION.  
VERTICAL ON LOW SIDE OF SUPERELEVATED SECTION.
- ③ USE 10" MINIMUM WHEN PEDESTRIAN FENCE IS INSTALLED TO ACCOMMODATE THE DEPTH OF ANCHOR BOLTS. DISTANCE TO BE DETAILED ON THE PLANS.



DEPARTMENT DIRECTOR  
BRADLEY C. WIEFERICH, PE

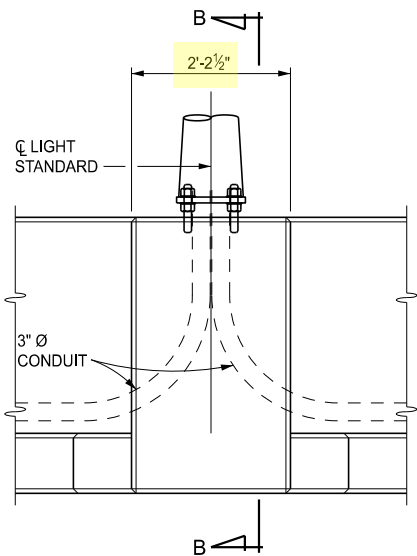
STANDARD PLAN FOR  
BRIDGE BARRIER RAILING, TYPE 7

(SPECIAL DETAIL)  
FHWA APPROVAL

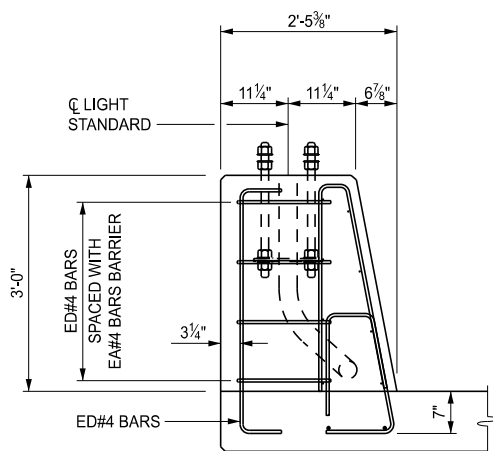
05/07/2026  
PLAN DATE

**B-28-A**

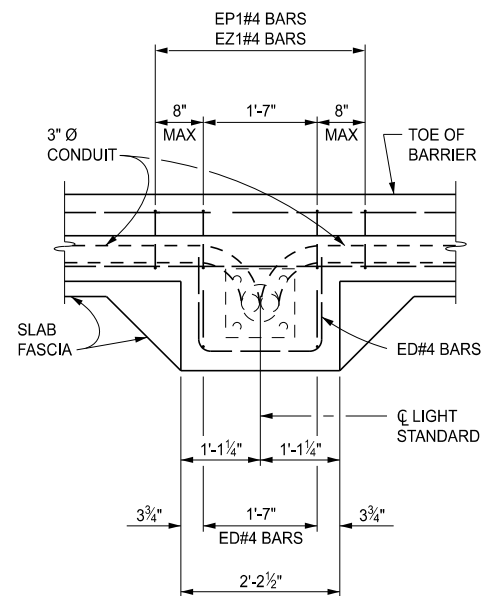
SHEET  
2 OF 7



ELEVATION VIEW



SECTION B-B



PLAN VIEW

LIGHT STANDARD DETAILS

NO AESTHETIC TREATMENT ON LIGHT STANDARD  $2'-2\frac{1}{2}" \times 1'-2\frac{7}{8}"$  PROTRUSION



DEPARTMENT DIRECTOR  
BRADLEY C. WIEFERICH, PE

STANDARD PLAN FOR  
BRIDGE BARRIER RAILING, TYPE 7

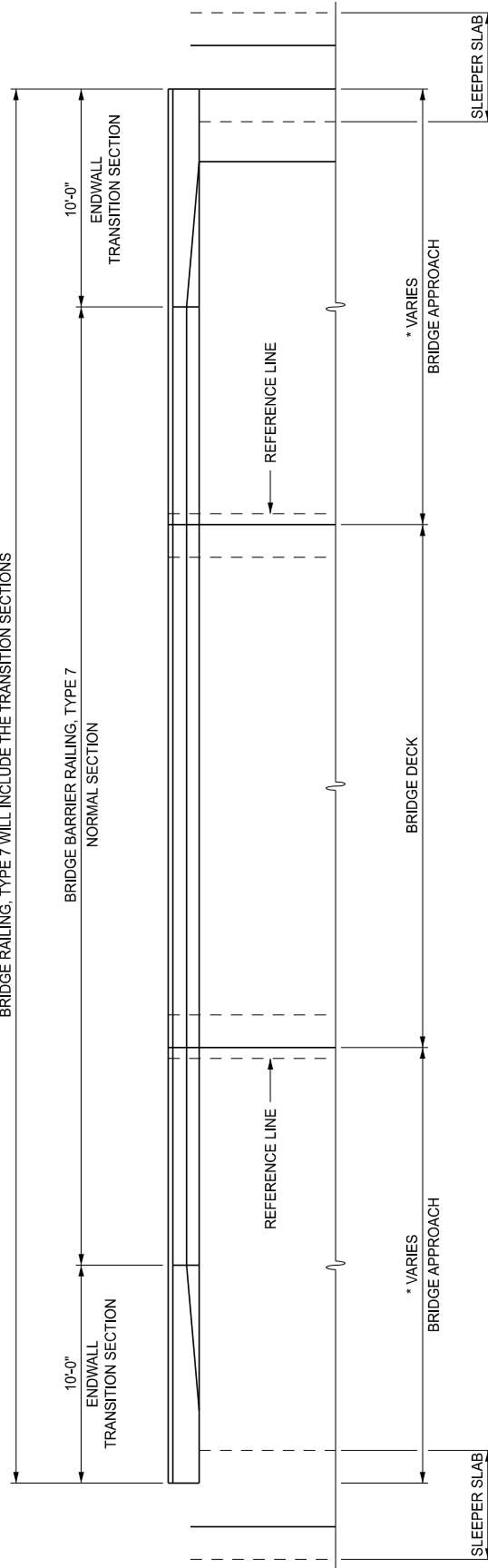
(SPECIAL DETAIL)  
FHWA APPROVAL

05/07/2026  
PLAN DATE

B-28-A

SHEET  
3 OF 7

BRIDGE RAILING, TYPE 7 WILL INCLUDE THE TRANSITION SECTIONS



**BRIDGE BARRIER RAILING, TYPE 7  
PLAN VIEW**

\* DEPENDANT UPON BRIDGE APPROACH LENGTH, THE TRANSITION SECTION CAN BE PARTLY ON BRIDGE DECK OR IF NO APPROACH SLAB IS PRESENT, ENTIRELY ON THE BRIDGE DECK.



DEPARTMENT DIRECTOR  
BRADLEY C. WIEFERICH, PE

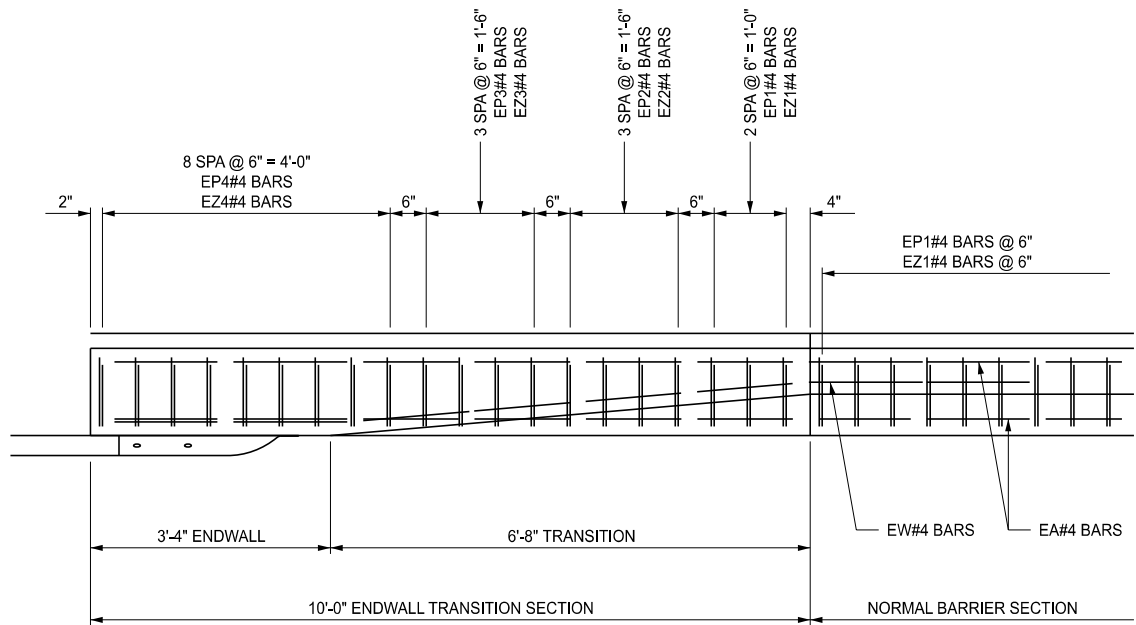
STANDARD PLAN FOR  
**BRIDGE BARRIER RAILING, TYPE 7**

(SPECIAL DETAIL)  
FHWA APPROVAL

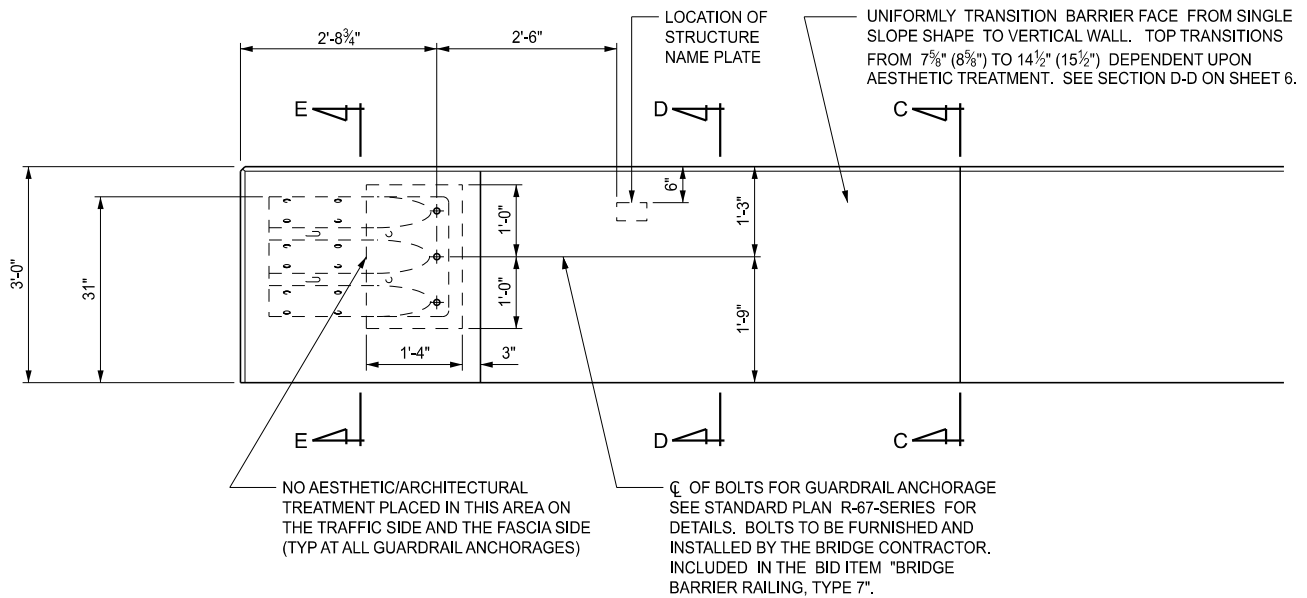
05/07/2026  
PLAN DATE

**B-28-A**

SHEET  
4 OF 7



PLAN VIEW



ELEVATION VIEW

**MDOT**  
Michigan Department of Transportation

DEPARTMENT DIRECTOR  
BRADLEY C. WIEFERICH, PE

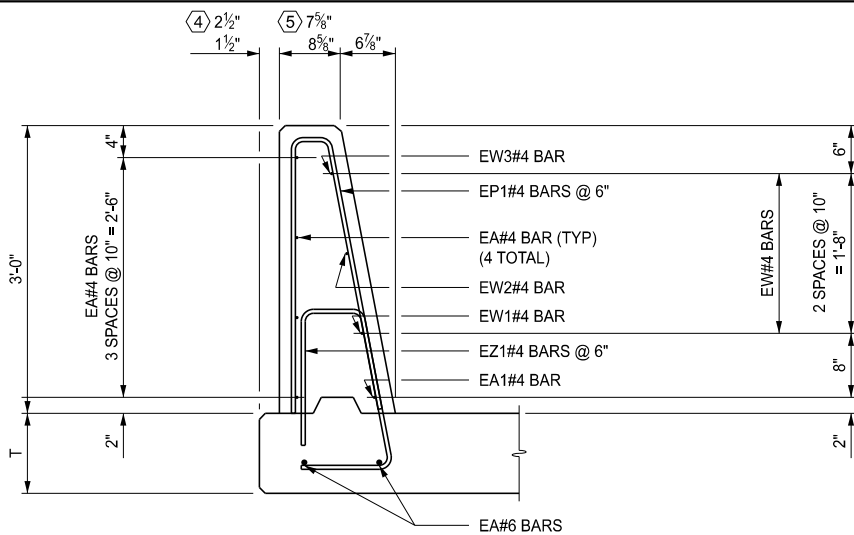
STANDARD PLAN FOR  
BRIDGE BARRIER RAILING, TYPE 7

(SPECIAL DETAIL)  
FHWA APPROVAL

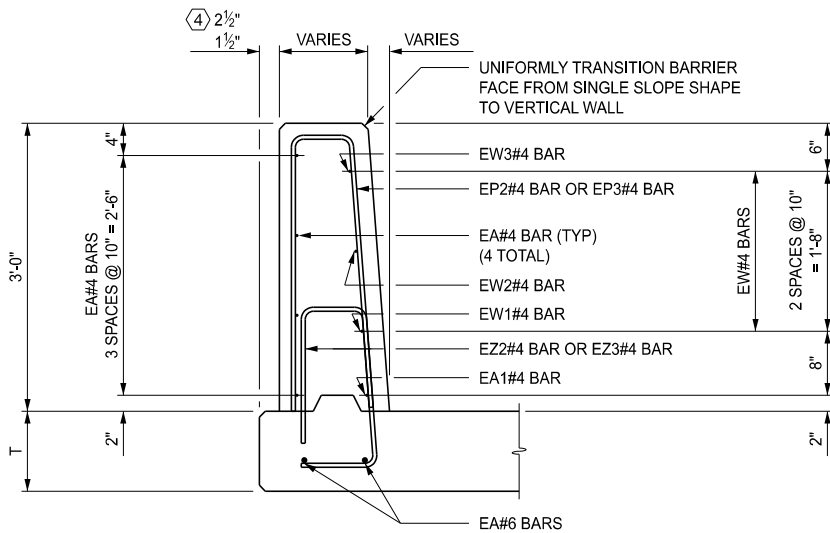
05/07/2026  
PLAN DATE

B-28-A

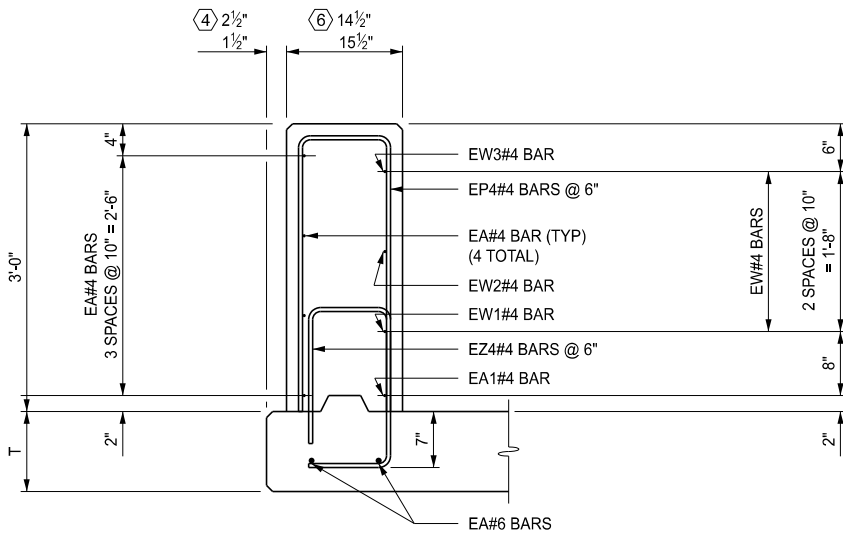
SHEET  
5 OF 7



SECTION C-C



SECTION D-D



SECTION E-E

- ④ 2½" BRIDGE BARRIER RAILING, TYPE 7 (+ SEE NOTES)  
1½" BRIDGE BARRIER RAILING, AESTHETIC, TYPE 7, DET 2
- ⑤ 7¾" BRIDGE BARRIER RAILING, TYPE 7 (+ SEE NOTES)  
8¾" BRIDGE BARRIER RAILING, AESTHETIC, TYPE 7, DET 2
- ⑥ 14½" BRIDGE BARRIER RAILING, TYPE 7 (+ SEE NOTES)  
15½" BRIDGE BARRIER RAILING, AESTHETIC, TYPE 7, DET 2



DEPARTMENT DIRECTOR  
BRADLEY C. WIEFERICH, PE

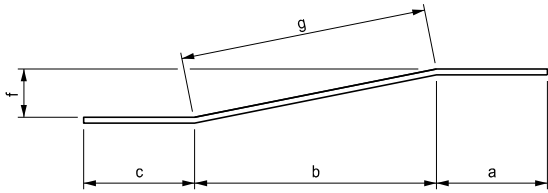
STANDARD PLAN FOR  
BRIDGE BARRIER RAILING, TYPE 7

(SPECIAL DETAIL)  
FHWA APPROVAL

05/07/2026  
PLAN DATE

B-28-A

SHEET  
6 OF 7

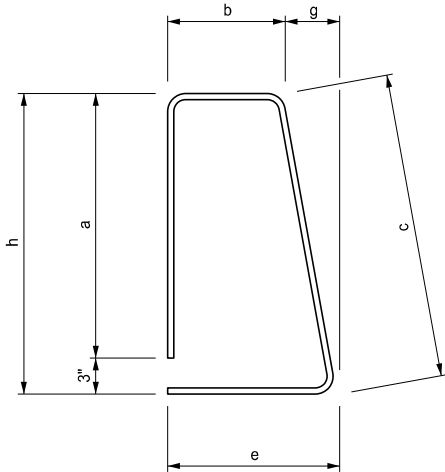


ENDWALL TRANSITION SECTION BARS							
	# of bars	c	b	a	g	j	
EA1	1	—	—	11'-11"	--	--	EA041111
EW1	1	3'-0"	5'-6"	3'-5"	5'-6"	1 <sup>7</sup> / <sub>8</sub> "	EW041111
EW2	1	3'-0"	5'-6"	3'-5 <sup>7</sup> / <sub>8</sub> "	5'-6 <sup>1</sup> / <sub>8</sub> "	3 <sup>7</sup> / <sub>8</sub> "	EW041200
EW3	1	3'-0"	5'-6"	3'-6 <sup>3</sup> / <sub>4</sub> "	5'-6 <sup>1</sup> / <sub>4</sub> "	5 <sup>3</sup> / <sub>4</sub> "	EW041201

$$L = c + a + g$$

BARRIER SECTION BARS									
	# of bars	a	b	c	e	g	h	h - a	
EZ1	--	1'-5"	7 <sup>3</sup> / <sub>8</sub> "	1'-8 <sup>3</sup> / <sub>8</sub> "	11 <sup>1</sup> / <sub>4</sub> "	3 <sup>5</sup> / <sub>8</sub> "	1'-8"	3"	EZ040408

$$L = a + b + c + e$$

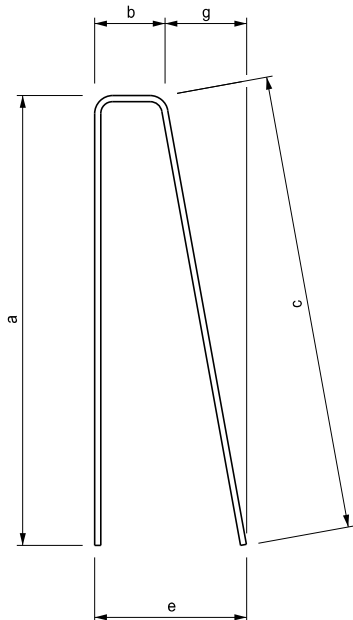


ENDWALL TRANSITION SECTION BARS									
	# of bars	a	b	c	e	g	h	h - a	
EZ1	3	1'-5"	7 <sup>3</sup> / <sub>8</sub> "	1'-8 <sup>3</sup> / <sub>8</sub> "	11 <sup>1</sup> / <sub>4</sub> "	3 <sup>5</sup> / <sub>8</sub> "	1'-8"	3"	EZ040408
EZ2	4	1'-5"	7 <sup>7</sup> / <sub>8</sub> "	1'-8 <sup>1</sup> / <sub>2</sub> "	10 <sup>7</sup> / <sub>8</sub> "	2 <sup>7</sup> / <sub>8</sub> "	1'-8"	3"	EZ040408
EZ3	4	1'-5"	8 <sup>3</sup> / <sub>4</sub> "	1'-8"	10 <sup>1</sup> / <sub>4</sub> "	1 <sup>1</sup> / <sub>2</sub> "	1'-8"	3"	EZ040408
EZ4	9	1'-5"	10 <sup>1</sup> / <sub>2</sub> "	1'-8"	10 <sup>1</sup> / <sub>2</sub> "	—	1'-8"	3"	EZ040410

$$L = a + b + c + e$$

BARRIER SECTION BARS							
	# of bars	a	b	c	e	g	
EP1	—	2'-10 <sup>1</sup> / <sub>4</sub> "	4 <sup>3</sup> / <sub>4</sub> "	2'-11"	11"	6 <sup>1</sup> / <sub>4</sub> "	EP040602

$$L = a + b + c$$



ENDWALL TRANSITION SECTION BARS							
	# of bars	a	b	c	e	g	
EP1	3	2'-10 <sup>1</sup> / <sub>4</sub> "	4 <sup>3</sup> / <sub>4</sub> "	2'-11"	11"	6 <sup>1</sup> / <sub>4</sub> "	EP040602
EP2	4	2'-9 <sup>7</sup> / <sub>8</sub> "	6 <sup>1</sup> / <sub>4</sub> "	2'-10 <sup>7</sup> / <sub>8</sub> "	11"	4 <sup>3</sup> / <sub>4</sub> "	EP040603
EP3	4	2'-10 <sup>5</sup> / <sub>8</sub> "	8 <sup>1</sup> / <sub>4</sub> "	2'-10 <sup>5</sup> / <sub>8</sub> "	11"	2 <sup>3</sup> / <sub>4</sub> "	EP040605
EP4	9	2'-10 <sup>1</sup> / <sub>2</sub> "	11"	2'-10 <sup>1</sup> / <sub>2</sub> "	11"	--	EP040608

$$L = a + b + c$$

NOTES:

DETAILS SHOWN ARE ACCORDING TO AASHTO SPECIFICATIONS.

SEE STANDARD PLAN B-103-SERIES FOR LIGHT STANDARD ANCHOR BOLT ASSEMBLY DETAILS,

ALL WORK AND MATERIAL ARE ACCORDING TO THE STANDARD SPECIFICATIONS FOR CONSTRUCTION.



DEPARTMENT DIRECTOR  
BRADLEY C. WIEFERICH, PE

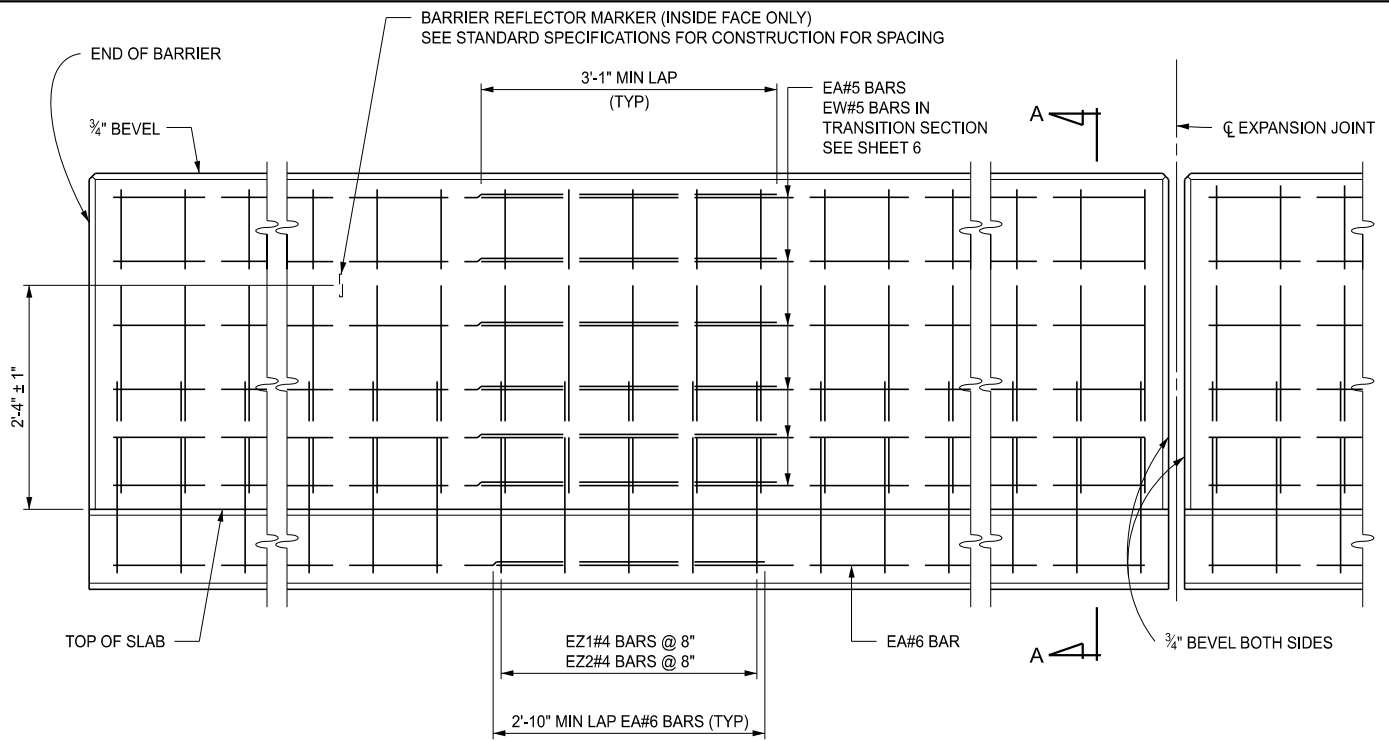
STANDARD PLAN FOR  
BRIDGE BARRIER RAILING, TYPE 7

(SPECIAL DETAIL)  
FHWA APPROVAL

05/07/2026  
PLAN DATE

B-28-A

SHEET  
7 OF 7



BRIDGE BARRIER RAILING, TYPE 6 OUTSIDE ELEVATION

APPROVED BY: \_\_\_\_\_  
DIRECTOR, BUREAU OF BRIDGES AND STRUCTURES

APPROVED BY: \_\_\_\_\_  
DIRECTOR, BUREAU OF FIELD SERVICES

APPROVED BY: \_\_\_\_\_  
DIRECTOR, BUREAU OF DEVELOPMENT



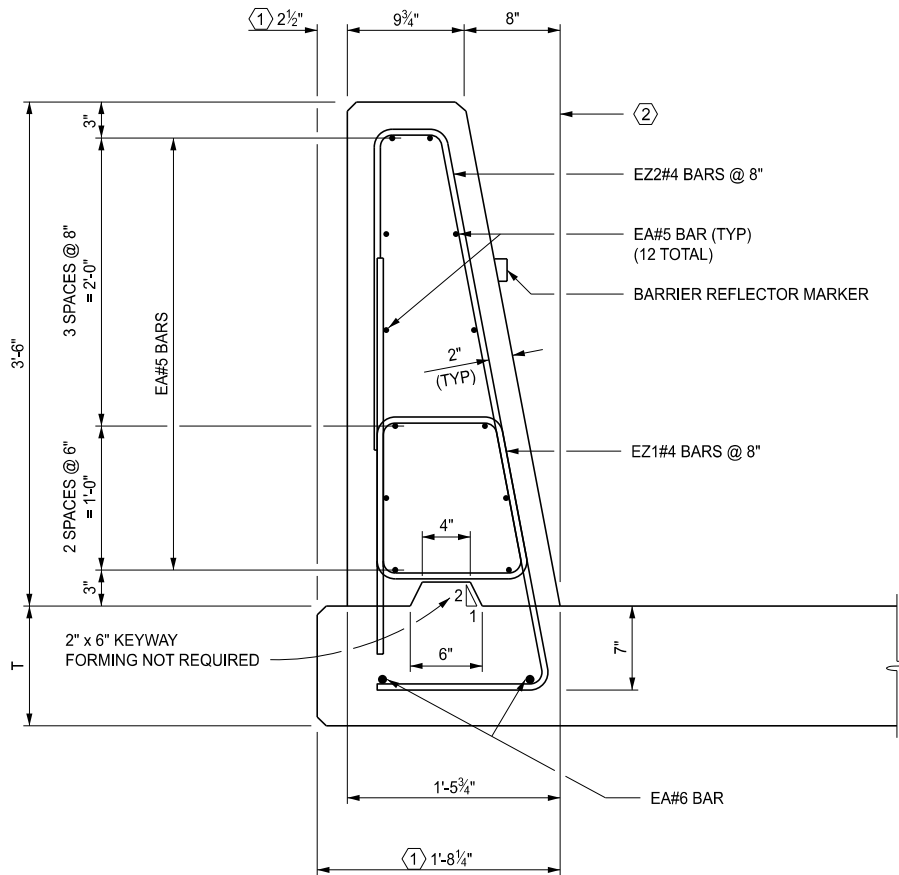
DEPARTMENT DIRECTOR  
BRADLEY C. WIEFERICH, PE

STANDARD PLAN FOR  
BRIDGE BARRIER RAILING, TYPE 6

(SPECIAL DETAIL) 05/07/2026  
FHWA APPROVAL PLAN DATE

B-29-A

SHEET  
1 OF 8



SECTION A-A  
NO AESTHETIC TREATMENT

① BACK OF BARRIER TO SLAB FASCIA MAY BE DECREASED TO 1 1/2" (FROM 2 1/2") AND TOE OF BARRIER SHIFTED ACCORDINGLY TO ACCOMMODATE THE NEED FOR INCREASED OR MAINTAINING SHOULDER WIDTHS. DISTANCE TO BE DETAILED ON THE PLANS.

② BRIDGE BARRIER ORIENTATION :

PERPENDICULAR TO PLANE OF SLAB ON NORMAL CROWN SECTION AND HIGH SIDE OF SUPERELEVATION SECTION.  
VERTICAL ON LOW SIDE OF SUPERELEVATED SECTION.



DEPARTMENT DIRECTOR  
BRADLEY C. WIEFERICH, PE

STANDARD PLAN FOR  
BRIDGE BARRIER RAILING, TYPE 6

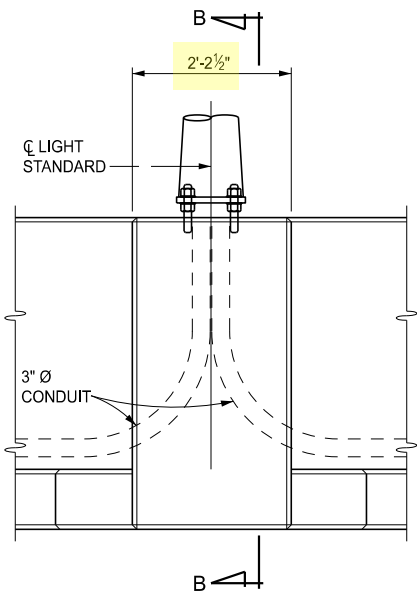
(SPECIAL DETAIL)  
FHWA APPROVAL

05/07/2026  
PLAN DATE

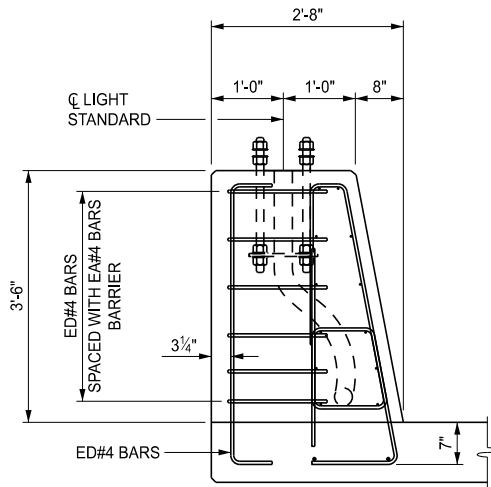
B-29-A

SHEET  
2 OF 8

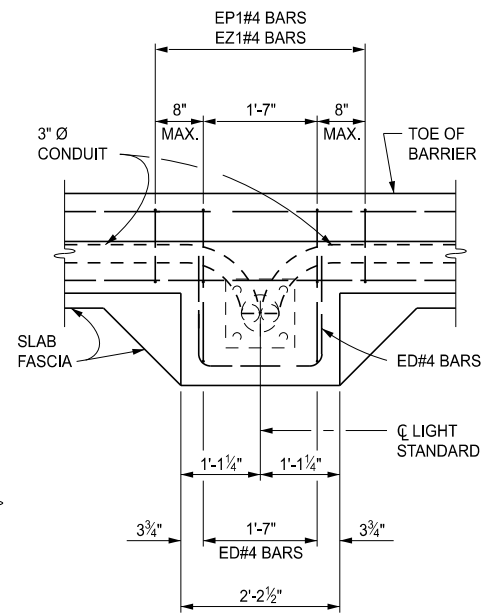




ELEVATION VIEW



SECTION B-B



PLAN VIEW

LIGHT STANDARD DETAILS

NO AESTHETIC TREATMENT ON LIGHT STANDARD 2'-2 1/2" x 1'-2 1/4" PROTRUSION



DEPARTMENT DIRECTOR  
BRADLEY C. WIEFERICH, PE

STANDARD PLAN FOR  
BRIDGE BARRIER RAILING, TYPE 6

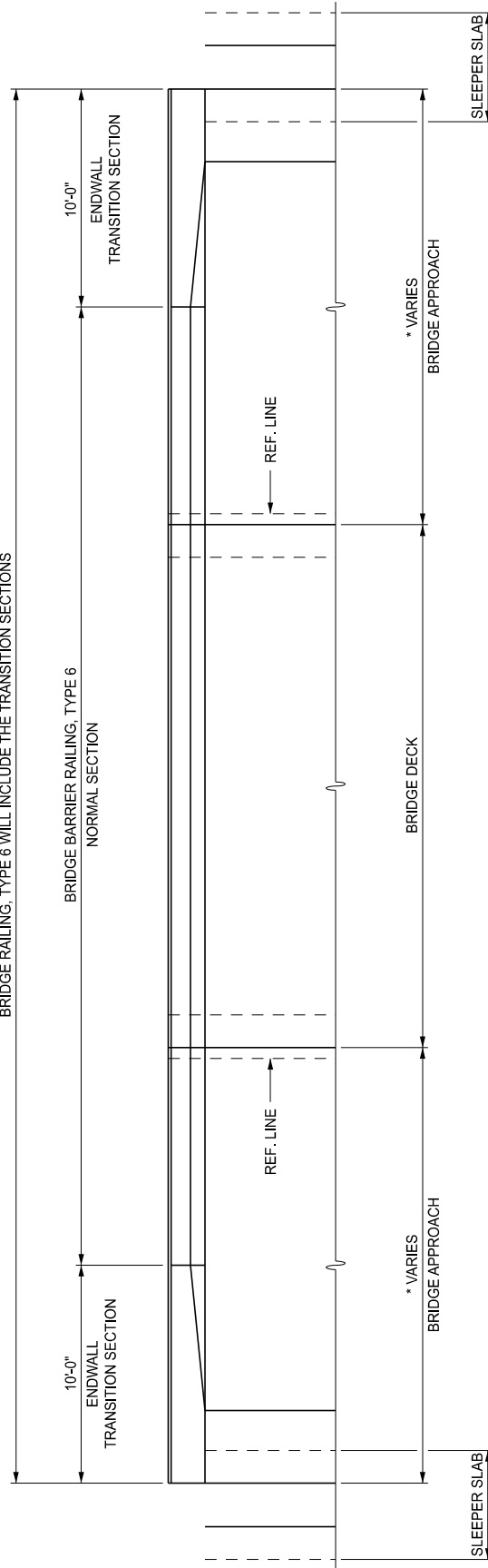
(SPECIAL DETAIL)  
FHWA APPROVAL

05/07/2026  
PLAN DATE

B-29-A

SHEET  
4 OF 8

BRIDGE RAILING, TYPE 6 WILL INCLUDE THE TRANSITION SECTIONS



**BRIDGE BARRIER RAILING, TYPE 6  
PLAN VIEW**

\* DEPENDANT UPON BRIDGE APPROACH LENGTH, THE TRANSITION SECTION CAN BE PARTLY ON BRIDGE DECK OR IF NO APPROACH SLAB IS PRESENT, ENTIRELY ON THE BRIDGE DECK.



DEPARTMENT DIRECTOR  
BRADLEY C. WIEFERICH, PE

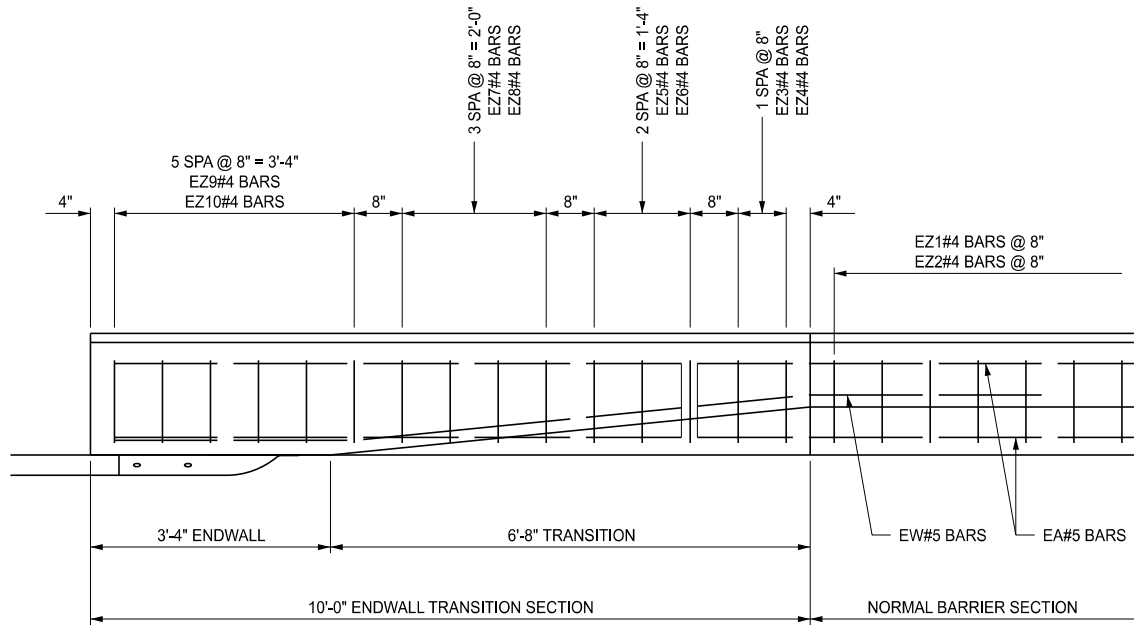
STANDARD PLAN FOR  
**BRIDGE BARRIER RAILING, TYPE 6**

(SPECIAL DETAIL)  
FHWA APPROVAL

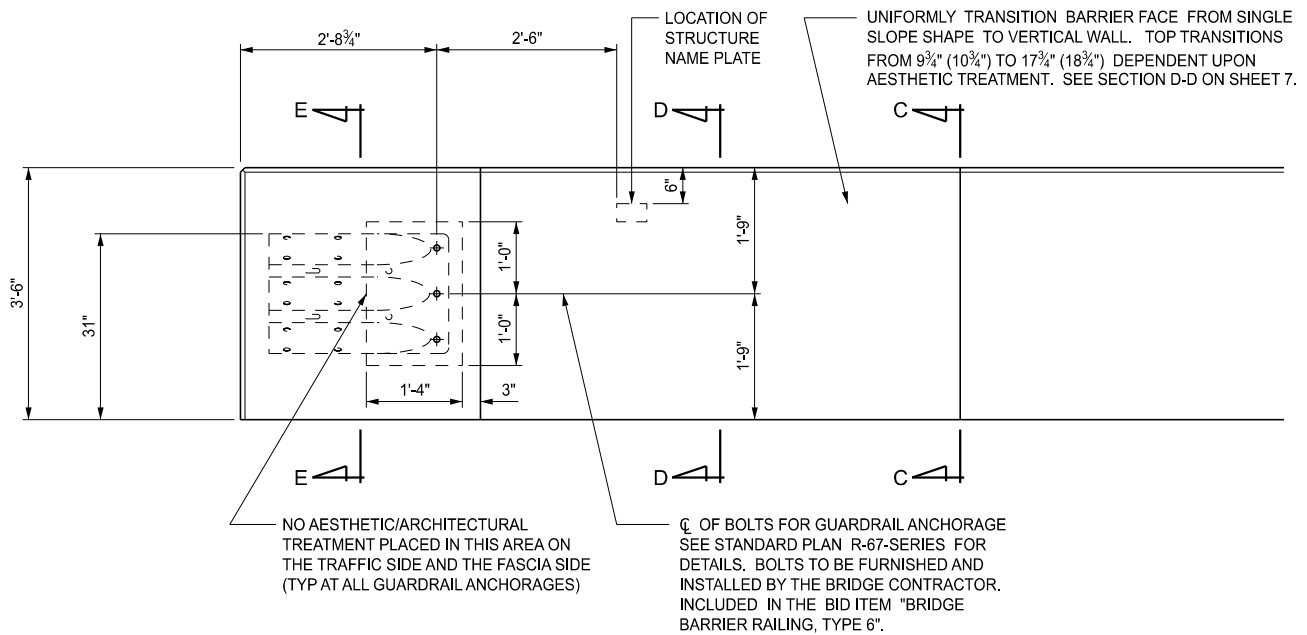
05/07/2026  
PLAN DATE

**B-29-A**

SHEET  
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PLAN VIEW

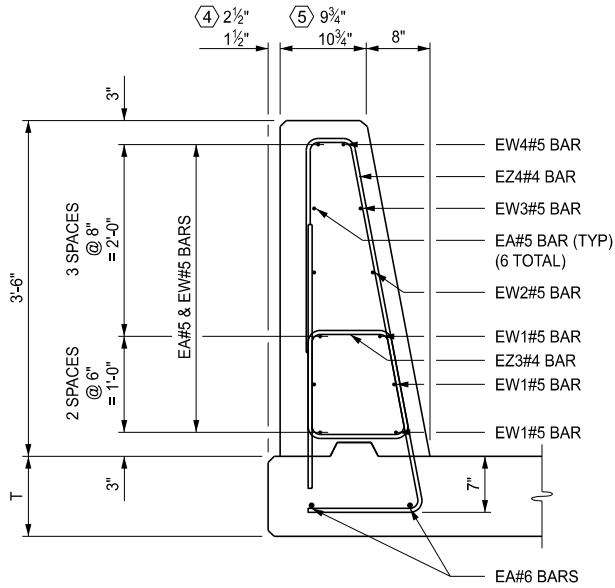


ELEVATION VIEW

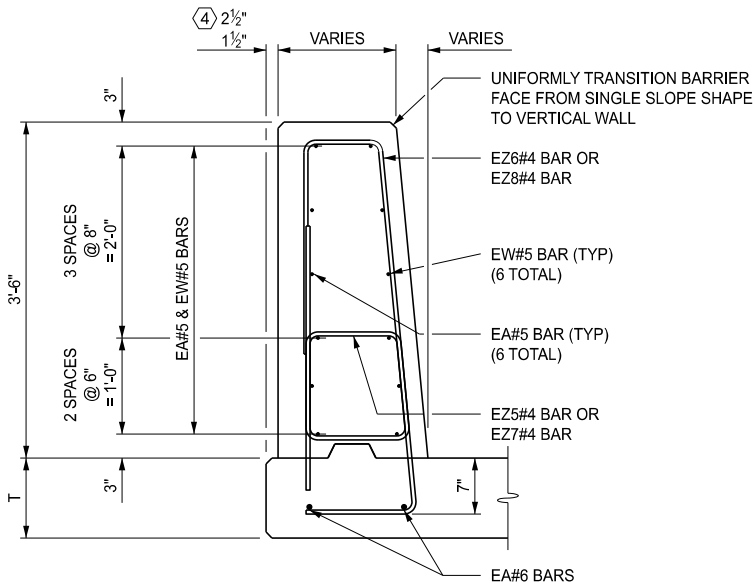
**MDOT**  
Michigan Department of Transportation

DEPARTMENT DIRECTOR  
BRADLEY C. WIEFERICH, PE

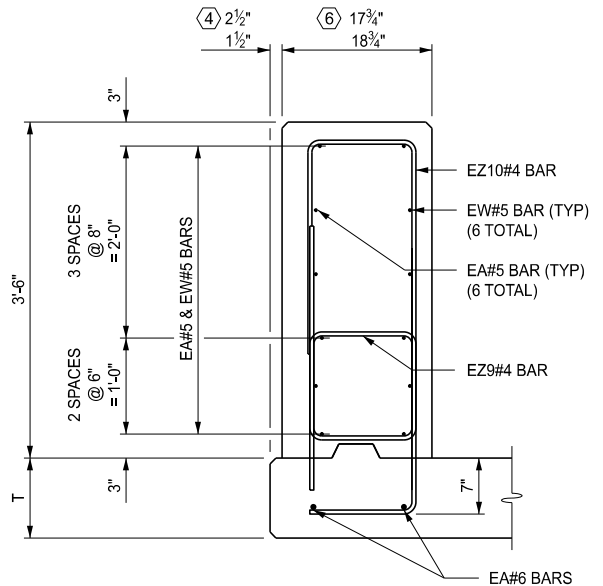
STANDARD PLAN FOR BRIDGE BARRIER RAILING, TYPE 6		<b>B-29-A</b>	SHEET 6 OF 8
(SPECIAL DETAIL) FHWA APPROVAL	05/07/2026 PLAN DATE		



SECTION C-C



SECTION D-D



SECTION E-E

- (4) 2 1/2" BRIDGE BARRIER RAILING, TYPE 6 (+ SEE NOTES)  
1 1/2" BRIDGE BARRIER RAILING, AESTHETIC, TYPE 6, DET 2
- (5) 9 3/4" BRIDGE BARRIER RAILING, TYPE 6 (+ SEE NOTES)  
10 3/4" BRIDGE BARRIER RAILING, AESTHETIC, TYPE 6, DET 2
- (6) 17 3/4" BRIDGE BARRIER RAILING, TYPE 6 (+ SEE NOTES)  
18 3/4" BRIDGE BARRIER RAILING, AESTHETIC, TYPE 6, DET 2



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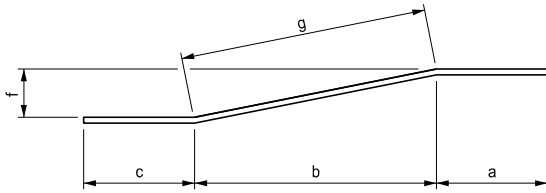
STANDARD PLAN FOR  
BRIDGE BARRIER RAILING, TYPE 6

(SPECIAL DETAIL)  
FHWA APPROVAL

05/07/2026  
PLAN DATE

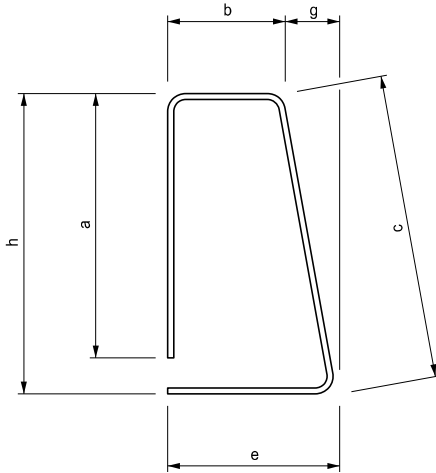
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ENDWALL TRANSITION SECTION BARS							
	# of bars	c	b	a	g	f	
EW1	3	2'-2"	2'-8"	7'-6"	2'-8"	1 <sup>5</sup> / <sub>8</sub> "	EW051204
EW2	1	2'-2"	6'-0"	4'-2 <sup>7</sup> / <sub>8</sub> "	6'-0 <sup>1</sup> / <sub>8</sub> "	4 <sup>1</sup> / <sub>4</sub> "	EW051205
EW3	1	2'-2"	6'-0"	4'-3 <sup>3</sup> / <sub>4</sub> "	6'-0 <sup>1</sup> / <sub>4</sub> "	5 <sup>3</sup> / <sub>4</sub> "	EW051206
EW4	1	2'-2"	6'-0"	4'-4 <sup>5</sup> / <sub>8</sub> "	6'-0 <sup>3</sup> / <sub>8</sub> "	6 <sup>7</sup> / <sub>8</sub> "	EW051207

$$L = c + a + g$$

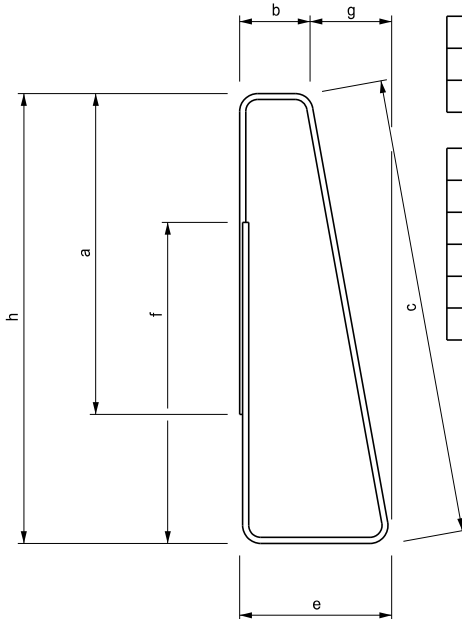


BARRIER SECTION BARS							
	# of bars	a	b	c	e	g	h
EZ1	--	1'-8 <sup>1</sup> / <sub>8</sub> "	10 <sup>3</sup> / <sub>4</sub> "	1'-11 <sup>1</sup> / <sub>8</sub> "	1'-3"	4 <sup>3</sup> / <sub>8</sub> "	1'-10 <sup>3</sup> / <sub>4</sub> "

$$L = a + b + c + e$$

ENDWALL TRANSITION SECTION BARS							
	# of bars	a	b	c	e	g	h
EZ3	2	1'-8"	10 <sup>3</sup> / <sub>8</sub> "	1'-11 <sup>1</sup> / <sub>8</sub> "	1'-2 <sup>1</sup> / <sub>2</sub> "	4 <sup>1</sup> / <sub>8</sub> "	1'-10 <sup>3</sup> / <sub>4</sub> "
EZ5	3	1'-7 <sup>3</sup> / <sub>4</sub> "	11"	1'-11"	1'-2 <sup>1</sup> / <sub>4</sub> "	3 <sup>1</sup> / <sub>4</sub> "	1'-10 <sup>3</sup> / <sub>4</sub> "
EZ7	4	1'-7 <sup>1</sup> / <sub>2</sub> "	11 <sup>3</sup> / <sub>4</sub> "	1'-10 <sup>7</sup> / <sub>8</sub> "	1'-1 <sup>7</sup> / <sub>8</sub> "	2 <sup>1</sup> / <sub>8</sub> "	1'-10 <sup>3</sup> / <sub>4</sub> "
EZ9	6	1'-7 <sup>3</sup> / <sub>4</sub> "	1'-1 <sup>3</sup> / <sub>4</sub> "	1'-10 <sup>3</sup> / <sub>4</sub> "	1'-1 <sup>3</sup> / <sub>4</sub> "	--	1'-10 <sup>3</sup> / <sub>4</sub> "

$$L = a + b + c + e$$



BARRIER SECTION BARS							
	# of bars	a	b	c	e	f	g
EZ2	--	2'-3 <sup>3</sup> / <sub>8</sub> "	6 <sup>1</sup> / <sub>8</sub> "	3'-2 <sup>1</sup> / <sub>4</sub> "	1'-1 <sup>1</sup> / <sub>4</sub> "	2'-3"	7 <sup>1</sup> / <sub>8</sub> "

$$L = a + b + c + e + f$$

ENDWALL TRANSITION SECTION BARS							
	# of bars	a	b	c	e	f	g
EZ4	2	2'-3 <sup>1</sup> / <sub>2</sub> "	6 <sup>1</sup> / <sub>2</sub> "	3'-2"	1'-1"	2'-3"	6 <sup>1</sup> / <sub>2</sub> "
EZ6	3	2'-3 <sup>7</sup> / <sub>8</sub> "	8 <sup>1</sup> / <sub>8</sub> "	3'-1 <sup>7</sup> / <sub>8</sub> "	1'-1 <sup>1</sup> / <sub>8</sub> "	2'-3"	5"
EZ8	4	2'-3 <sup>5</sup> / <sub>8</sub> "	10 <sup>1</sup> / <sub>2</sub> "	3'-1 <sup>5</sup> / <sub>8</sub> "	1'-1 <sup>1</sup> / <sub>4</sub> "	2'-3"	2 <sup>3</sup> / <sub>4</sub> "
EZ10	6	2'-3 <sup>1</sup> / <sub>2</sub> "	1'-1 <sup>1</sup> / <sub>2</sub> "	3'-1 <sup>1</sup> / <sub>2</sub> "	1'-1 <sup>1</sup> / <sub>2</sub> "	2'-3"	--

$$L = a + b + c + e + f$$

NOTES:

DETAILS SHOWN ARE ACCORDING TO AASHTO SPECIFICATIONS.

SEE STANDARD PLAN B-103-SERIES FOR LIGHT STANDARD ANCHOR BOLT ASSEMBLY DETAILS.

ALL WORK AND MATERIAL ARE ACCORDING TO THE STANDARD SPECIFICATIONS FOR CONSTRUCTION.



DEPARTMENT DIRECTOR  
BRADLEY C. WIEFERICH, PE

STANDARD PLAN FOR  
BRIDGE BARRIER RAILING, TYPE 6

(SPECIAL DETAIL)  
FHWA APPROVAL

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# MICHIGAN DESIGN MANUAL

## ROAD DESIGN

### 2.03 TYPICAL CROSS SECTIONS

(revised 8-26-2019)

A typical cross section shows, in elevation view, what is to be constructed. The proposed typical section can be superimposed on an existing road cross section as in the case of a resurfacing or widening project or be entirely new as in the case of a new or relocated roadway. Typical cross sections show all details of the proposed roadway including lane width (including bike lanes), shoulders, slopes, ditches, curb and gutters, sidewalks or pathways, subbase, and pavement. Typical cross sections are important and necessary for determining earthwork quantities. Some examples are shown in the [Guidelines for Plan Preparation](#). Also, all the above design elements should meet AASHTO safety requirements.

#### 2.03.01 Slopes

(revised 5-26-2026)

Slopes are measured as a ratio of vertical distance to horizontal distance, a *1:4 slope indicates 1 foot vertical drop in every 4 feet horizontally*. Slopes should be as flat as practical for existing conditions and type of roadway. 1:6 slopes are desirable for foreslopes or fill slopes for new trunkline construction. Slopes 1:3 or flatter are considered traversable if there are no other obstructions within the clear zone. See [Section 7.01.30](#) for barrier warrants at embankments.

The following general criteria should be used for foreslopes, **based on the fill height**:

- **Freeways and free access roads where Right-of-Way is adequate**
  - **Less than 10' use 1:6 slope**
  - **10' to 25' use 1:4 slope**
  - **Over 25' use 1:2 slope**
- **Roadways where Right-of-Way is limited**
  - **Less than 10' use 1:6 to 34' from the edge of the through lane, then 1:3 slope**
  - **10' to 20' use 1:4 slope**
  - **Over 20' use 1:2 slope**

In situations where ditch backslopes are involved and slopes must be steepened, for instance, to stay within the proposed or existing ROW, the ditch backslope should be steepened in preference to steepening the foreslope.

- **The preferable traversable ditch cross sections are:**
  - **1:6 foreslope use 1:3 backslope**
  - **1:5 foreslope use 1:3.5 backslope**
  - **1:4 foreslope use 1:4 backslope**

Other combinations are less desirable and their use should be limited where high angle encroachments are expected, such as at the outside of curves. However, it is understood that in certain situations (high fills, deep cuts, limited ROW, physical obstructions, etc.) the use of 1:2 slopes may be necessary.

# MICHIGAN DESIGN MANUAL

## ROAD DESIGN

### 2.04.01 Excavation

(revised 5-26-2026)

Excavation can be in other forms than regular roadway excavation. Following is a brief description of some of these special or project specific items.

#### 2.04.01A Station Grading

This item is often used on projects where normal earthwork items are not practical, or when recommended by Region Construction.

Station grading is typically paid for by **station** and requires a special provision. The Designer should include an estimate of excavation and embankment requirements for the Contractor's information for bidding purposes.

#### 2.04.01B Trenching

This item is used when a uniform section is to be excavated such as for a widening or reconstructing a shoulder. The excavation is typically a uniform width and depth.

Trenching is a standard specification pay item and because of uniformity an excavation quantity does not need to be estimated.

#### 2.04.01C Topsoil Stripping

Topsoil removal shall be as follows:

- Peat and Muck Areas - Topsoil shall not be removed.
- Borrow and Clear Vision Areas - Topsoil shall be removed to the required depth and width. Topsoil may be stockpiled near its original location, unless otherwise specified.
- Roadway Cut Areas - Topsoil shall be removed within the slope stake lines.
- Roadway Embankment Areas - Topsoil shall be removed within the slope stake lines, unless otherwise specified.

Topsoil from the roadway shall be stockpiled within the right-of-way and outside the limits of construction or used in the slopes as specified. Temporary stockpiling of topsoil may be permitted on private property with the proper permits from the owner and as approved.

Topsoil Stripping in both cut and fill sections is paid for as earth excavation. The quantity is included in the earth excavation total, but is also presented separately for estimating purposes. Depth of stripping is determined by information from the Region Soils Engineer. It is shown on the plans as follows:

- Excavation, Earth [insert number] Cyd
- Embankment, CIP [insert number] Cyd

\* Includes [insert number] Cyd of Topsoil Stripping

## MICHIGAN DESIGN MANUAL ROAD DESIGN

In accordance with Executive Order 11990, new construction located in wetlands shall be avoided unless there is no practicable alternative to the construction and the proposed action includes all practicable measures to minimize harm to wetlands which may result from such construction. Practical measures to minimize harm include avoiding the permanent or temporary storage of muck in wetlands wherever possible. Some guidelines to further define this issue might be:

1. Permanent storage of excavated muck in wetlands or in the 100-year floodplain will not be allowed except in very extreme circumstances. Even then, the use of these areas will require FHWA approval and acquiring the required EGLE and Corps of Engineers permits.
2. The temporary or permanent storage of dry muck in wetlands should not be necessary.
3. The temporary storage of wet muck in a wetland may, at times, be justified for such time as is necessary to dry out prior to final shaping of the slope and/or hauling to an approved upland disposal area.
4. In our opinion, the temporary disposal areas in wetlands, from most desirable to least desirable, are:
  - a. Between the one-on-one slope and the plan slope (also acceptable for permanent storage in fills less than 13'-0" in height).
  - b. In the median area (for dual lane roadway projects).
  - c. On the side of the roadway where the remaining muck is the shallowest or the remainder of the wetland is the smallest.
  - d. Adjacent area outside the highway Right-of-Way.

FHWA will permit permanent storage of waste muck, outside the plan fill slope, in an upland site without specific approval. An "upland" site is not to be interpreted as "offsite", i.e., another wetland area off the project.

FHWA appears to not favor temporary storage in a wetland area. They must specifically approve it and approve the limits at the same time as giving other wetland permissions.

The FHWA wetland review during the design stage must occur prior to submitting applications for EGLE and Corps of Engineers permits. FHWA may deny any extra use of a wetland even if a project has received EGLE and U.S. Fish and Wildlife Service approval, in an earlier environmental clearance, to use the wetland.

Wetlands are defined in Executive Order 11990 as "those areas that are inundated by surface or ground water with a frequency sufficient to support and under normal circumstances does or would support a prevalence of vegetative or aquatic life that requires saturated or seasonally saturated soil conditions for growth and reproduction. Wetlands generally include swamps, marshes, bogs, and similar areas such as sloughs, natural depressions, wet meadows, river overflows, mud flats, and natural ponds.

No localized slope change will be permitted, to circumvent this federal edict, by showing a flatter plan fill slope than shown on the typical cross-section.

The plans should show estimated quantities of peat, marl, and soft clay, for each swamp area, that are to be hauled to upland disposal sites.

# MICHIGAN DESIGN MANUAL

## ROAD DESIGN

### 2.04.01F Subgrade Undercutting

This item is used to remove unsuitable and unstable soils and soils susceptible to frost action before constructing the final section. Subgrade undercut areas are backfilled with undercut excavated material, sound earth, or granular material depending on the type of undercut. Backfilling is included in the item "Subgrade Undercutting, Type [Insert Type]." The type of subgrade undercutting depends on the backfill. (Type I is backfilled with selected clay or other approved material; Type II is backfilled with granular material; Type III is backfilled with reworked material from subgrade undercut areas or other approved material and Type IV is backfilled with dense-graded aggregate or open-graded aggregate.). The Region Soils Engineer will generally provide subgrade undercut quantities.

### 2.04.02 Embankment

(revised 12-27-2022)

#### 2.04.02A Regular Embankment

Regular Embankment is sound earth obtained from either roadway excavation or from borrow areas. Embankment is generally paid for as embankment compacted in place, therefore no shrinkage factor is applied to the volume.

#### 2.04.02B Granular Embankments and Backfill

Granular materials are used as backfill in swamps and subgrade undercut areas. If granular material is plentiful from the roadway excavation, it can also be used as regular embankment.

Granular material used to backfill swamp excavation is paid for as "Backfill, Swamp" and is generally measured in its original position. When granular material is used to backfill subgrade undercut areas it is not paid for separately.

#### 2.04.02C Subbase

Subbases are constructed of granular material between the subgrade (constructed of regular embankment) and the pavement structure. The subbase layer provides structural support and good drainage beneath the pavement.

Payment can be either "Subbase, LM" (loose measure) or "Subbase, CIP" (compacted in place).

#### 2.04.02D Topsoil Surface

There are two basic topsoil pay items: "Topsoil Surface, Furn" and "Topsoil Surface, Salv".

The Designer should confer with the Region Soils Engineer to get a recommendation for topsoil. Other topsoil resource people are the Region Resource Specialist and the Roadside Development Unit.

Generally the quality of topsoil within the right of way is very poor on existing highways and it should not be recycled as topsoil. Nearly all resurfacing, rubblizing, safety and guardrail upgrading, lane widening as well as other types of upgrading work have unacceptable roadside topsoil for salvaging. On these types of projects "Topsoil Surface, Furn" should be used. Occasionally some salvaged topsoils may be acceptable but in insufficient quantity.

More than enough good quality salvaged topsoil is usually available on all new construction projects (new highway routes). Use the pay item "Topsoil Surface, Salv" on such projects. Excess topsoil can be used in fill slopes as shown on the plans or as directed by the Engineer.

Topsoil material is spread on exposed slopes that are to be seeded. "Topsoil Surface, Furn" or

# MICHIGAN DESIGN MANUAL

## ROAD DESIGN

### 2.05.01E Capture Sediment

Effective sediment control measures are designed and implemented to slow the runoff velocity and retain the sediment-laden water to allow soil particles to fall from suspension and settle out of the runoff. This will facilitate transport reduction and thereby reduce the volume of sediment leaving the site.

### 2.05.02 Plan Preparation

(revised 5-26-2026)

Soil erosion and sedimentation control measures and locations are detailed on the plans for the areas within the limits of earth disturbance. Unless stated otherwise in the contract documents, the limits of earth disturbance will extend ten feet beyond the slope stake line except in areas adjacent to wetlands where the earth disturbance limits will be at the slope stake line. The extra ten feet is allowance for the movement of equipment and materials.

The SESC measures established for the project must provide adequate controls within the entire limits of earth disturbance. Noncontiguous clearing areas must also be considered when setting up SESC measures on the plans.

SESC measures must suit the specific construction project. Each of the following must be considered in preparation for selecting specific measures:

- Specific requirements included in environmental permits
- Environmental Classification/Certification (Supplied by Environmental Clearance Coordinator)
- Extent of earth disturbance on the project
- Soil types in the construction area
- Steepness and length of slopes
- Water resources on and adjacent to the project
- Staging and sequence of the construction activity
- Duration of the project
- Increase in impervious surface area
- Potential equipment egress points

By the preliminary plan review stage, the designer should have completed an analysis of the potential for soil erosion and sedimentation to occur during the construction phase. The soils engineer and others should have been contacted for suggestions. A combination of standard and site specific E&S measures should be incorporated and adequate pay item quantities included giving the contractor and construction staff the tools they will inevitably need to execute the project.

The following discussion is not intended to be all inclusive but rather to get the designer thinking about what must be considered and how they can be mitigated by the careful selection of SESC pay items.